

Amendments to the Drawings:

The attached Sheet 2/2 of drawings includes a change to Figure 4 to identify the Figure as prior art. This sheet, which includes Figures 3 and 4, replaces the Replacement Sheet 2/2 mailed with the Preliminary Amendment that included Figures 3 and 4. Also attached is an annotated sheet showing the change circled in red.

REMARKSAmendments

Claim 1 has been amended to recite that the variable resistive element is a polymer PTC element. Basis for this is found in original claims 3 and 9 (which have been canceled) and in the specification in paragraph [0019]. Claim 4 has been amended to correct a grammatical error. Claim 8 has been canceled. These amendments have been made in the interest of rapid prosecution and without prejudice to Applicants' right to prosecute claims of similar or different scope to the unamended claims in one or more continuation applications.

In the drawings, Figure 4 has been amended as indicated below.

The Objection to the Drawings

Applicants respectfully traverse the objection to the drawings, insofar as the objection is applicable to the amended drawings.

Applicants have added a legend "Prior Art" to Figure 4, as requested by the Examiner. A replacement page with this legend and a page showing the proposed change in red ink, are attached.

IDS

On page 2 of the Office Action, the Examiner indicated that the IDS dated November 17, 2008 was not in conformance with 37 CFR § 1.98 as the U.S. patent numbers included on the IDS should be typed and should include the publication dates and inventors. Applicants did not submit the version of the IDS to which the Examiner refers. Rather, a version listing only foreign documents was sent. Applicants did identify in the Disclosure Statement under 37 CFR § 1.56 that accompanied the IDS the US counterparts of the listed foreign patents, and included those US patents as translations of the foreign patents cited on the IDS. The Examiner did sign and return a copy of the IDS that listed those foreign patents, so Applicants believe that the art has been considered.

The Rejection Under 35 USC § 102(b)

Applicants respectfully traverse the rejection of claims 1-3, 5-6, and 10-11 under 35 USC § 102(b) as anticipated by Ikeda (U.S. Patent No. 6,963,477), insofar as the rejection is applicable to the amended claims.

The present claims are directed to an overheat protection device comprising a variable resistive element which is a polymer PTC element that changes resistance as a function of temperature. The device further comprises a switching element which controls a current flowing through an electrical system depending on an applied voltage thereto. The variable resistive element is located on and thermally combined with a certain position of the electrical system and interrupts the current flowing through the electrical system by changing the applied voltage to the switching element when the certain position comes to be under a high temperature condition. In contrast to conventional systems in which detection of a temperature anomaly and the restriction of current once the temperature anomaly is detected is done by the variable resistive element only, the present claims recite a device in which the variable resistive element is used in combination with the switching element. The variable resistive element changes the applied voltage to the switching element and interrupts the current flowing through the system. It is thus possible to effectively prevent the overheating by promptly detecting the temperature anomaly of the electrical system while the decrease in power efficiency of the electrical system is low. In one embodiment, a plurality of variable resistive elements are used and can be positioned on various portions of the electrical system, e.g. a secondary battery.

Ikeda discloses a circuit in which a semiconductor switching element interrupts the current path from a power supply to a load. A conductive operation is shifted to an interrupt operation by using a change in resistance of a first PTC thermistor when the temperature of a temperature detection portion increases and reaches a predetermined interrupt temperature. When the temperature of the temperature detection portion decreases and reaches a return temperature, the interrupt operation is shifted to a conductive operation by using a change in the resistance of a second PTC thermistor. Both PTC thermistors are thermally coupled to the temperature detection portion. Unlike the present claims, Ikeda teaches the use of ceramic PTC devices (see Column 6, lines 8-13). There is no disclosure of polymer PTC devices, which have sharper switching temperatures than ceramic PTC devices. Because the switch from a low resistance to a high resistance occurs over a smaller temperature range for a polymer PTC device, such polymer PTC devices allow the circuit to go from a higher to a lower voltage without using

a separate control element as is required by Ikeda. Thus the present claims are not anticipated by Ikeda.

The Rejection Under 35 USC § 103(a)

Applicants respectfully traverse the rejection of claims 4 and 7 under 35 USC § 103(a) as unpatentable over Ikeda (U.S. Patent No. 6,963,477), insofar as the rejection is applicable to the amended claims.

Claim 4 recites the use of a plurality of variable resistive elements connected in series. As indicated above, Ikeda discloses the presence of two PTC devices, but these are not connected in the manner recited in claim 4. In addition, the electrical connection shown in Ikeda of the two PTC devices is essential for the operation of Ikeda's circuit, and one looking to make an overheat protection device of the type currently claimed would not be taught that from Ikeda. In addition, there is nothing in Ikeda that would lead one to the device as claimed in claim 7, since the electrical construction of the device is different.

Applicants respectfully traverse the rejection of claims 8 and 9 under 35 USC § 103(a) as unpatentable over Ikeda (U.S. Patent No. 6,963,477) in view of Furuta et al. (U.S. Patent No. 6,661,633), insofar as the rejection is applicable to the amended claims. Applicants believe that this rejection is rendered moot in view of the cancelation of these claims.

Conclusion

It is believed that this application is now in condition for allowance and such action at an early date is earnestly requested. If, however, there are any outstanding issues which can be usefully discussed by telephone, the Examiner is asked to call the undersigned.

Respectfully submitted,

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